

CLAIMS

What is claimed is:

1. A method of reducing the acidity of flue gas, comprising the steps of:
 - a) partially combusting the fuel in a first stage to create a reducing environment;
 - 5 b) maintaining the reducing environment for a sufficient time period such that reducible acids are reduced to achieve a desirable acidity concentration in the flue gas;
 - c) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment;

thereby decreasing the acidity of the flue gas by reducing the acid concentration of the

10 gas.

2. The method of claim 1, further including the step of micro-staging the first stage fuel combustion.

3. The method of claim 2, wherein the micro-staging is provided through the use of low-NO_x burners.

15 4. The method of claim 1, further including the step of macro-staging the first stage of fuel combustion.

5. The method of claim 4, wherein the macro-staging is provided through the use of over-fired air.

20 6. The method of claim 1, further including a combination of micro-staging and macro-staging.

7. The method of claim 6, wherein the micro-staging is provided by low-NO_x burners and the macro-staging is provided by over-fired air.

8. The method of claim 1, wherein the fuel is coal.

9. A combustion furnace operated with a method for reducing the acidity of the flue 5 gas, the method steps comprising:

a) partially combusting the fuel in a first stage to create a reducing environment;

b) maintaining the reducing environment for a sufficient time period such that reducible acids are reduced to achieve a desirable acidity concentration in the flue gas;

c) combusting the remainder of the fuel and combustion intermediates in a second stage

10 with oxidizing environment;

thereby decreasing the acidity of the flue gas by reducing the acid concentration of the gas.

10. The method of claim 9, further including the step of micro-staging the first stage fuel combustion.

15 11. The method of claim 10, wherein the micro-staging is provided through the use of low-NO_x burners.

12. The method of claim 9, further including the step of macro-staging the first stage of fuel combustion.

13. The method of claim 12, wherein the macro-staging is provided through the use of 20 over-fired air.

14. The method of claim 9, further including a combination of micro-staging and macro-staging.

15. The method of claim 14, wherein the micro-staging is provided by low-NOx burners and the macro-staging is provided by over-fired air.

5 16. The method of claim 9, wherein the fuel is coal.

17. A method of lowering the acid dewpoint temperature of flue gas, comprising the steps of:

a) partially combusting the fuel in a first stage to create a reducing environment;

b) adjusting the reducing environment for a sufficient time period such that the flue gas

10 acid dewpoint is lowered to a desirable level;

c) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment;

thereby lowering the acid dewpoint temperature of the flue gas by reducing the acid concentration of the flue gas.

15 18. The method of claim 17, further including the step of micro-staging the first stage fuel combustion.

19. The method of claim 18, wherein the micro-staging is provided through the use of low-NOx burners.

20. The method of claim 17, further including the step of macro-staging the first stage of fuel combustion.

21. The method of claim 20, wherein the macro-staging is provided through the use of over-fired air.
22. The method of claim 17, further including a combination of micro-staging and macro-staging.
- 5 23. The method of claim 22, wherein the micro-staging is provided by low-NOx burners and the macro-staging is provided by over-fired air.
24. The method of claim 17, wherein the fuel is coal.
25. A method of lowering the acid dewpoint temperature of flue gas, comprising the steps of:
 - 10 a) partially combusting the fuel in a first stage to create a reducing environment;
 - b) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment;
 - c) measuring the acid dewpoint of the flue gas;
 - d) adjusting the reducing environment for a sufficient time period such that the flue gas 15 acid dewpoint is lowered to a desirable level;thereby decreasing the acid dewpoint temperature of the flue gas by reducing the reducible acid concentration of the gas.
26. The method of claim 25, further including the step of micro-staging the first stage fuel combustion.
- 20 27. The method of claim 26, wherein the micro-staging is provided through the use of low-NOx burners.

28. The method of claim 25, further including the step of macro-staging the first stage of fuel combustion.

29. The method of claim 28, wherein the macro-staging is provided through the use of over-fired air.

5 30. The method of claim 25, further including a combination of micro-staging and macro-staging.

31. The method of claim 30, wherein the micro-staging is provided by low-NOx burners and the macro-staging is provided by over-fired air.

32. The method of claim 25, wherein the fuel is coal.

10